



National Center for Science and
Engineering Statistics

Survey

Early Career Doctorates Survey | 2017

The ECDS provides statistics on the demographics, labor market experiences, and jobs held by early career doctorates working at academic institutions and federally funded research and development centers and covers all doctoral degree fields regardless of degree origin.

Survey Description

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Survey Overview (2017 Cycle)

Purpose

The Early Career Doctorates Survey (ECDS) is designed to provide nationally representative statistics on recent doctorate (or equivalent) recipients working at U.S. master's degree- or doctorate-granting academic institutions (excluding medical schools and centers) and federally funded research and development centers (FFRDCs). Established by the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation to address the need for greater information on postdoctoral researchers (postdocs) and individuals working in the United States who earned their first doctoral degree abroad, the ECDS provides the most comprehensive data collected to date on the demographics, labor market experiences, and jobs held by doctorates in the first decade after earning their degree. These data include information on job quality and training, professional activities and achievements, work-life balance, mentoring, research opportunities, and career plans.

Data collection authority

The information is solicited under the authority of the National Science Foundation Act of 1950; as amended, the America COMPETES Reauthorization Act of 2010; and the Confidential Information Protection and Statistical Efficiency Act of 2002. The Office of Management and Budget control number for this survey is 3145-0235, with an expiration date of 30 September 2019.

Major changes to recent survey cycle

The 2017 ECDS was the first full-scale implementation of the survey.

Key Survey Information

Frequency	The frequency of this data collection has not been established.
Initial survey year	2017.
Reference period	The week of 1 October 2017.
Response unit	Individuals working at U.S. academic institutions (excluding medical schools and centers) and FFRDCs.
Sample or census	Sample.
Population size	Approximately 186,700 individuals. Note: Estimating the size of the U.S. early career doctorate population is a key goal of the ECDS.
Sample size	15,465 individuals.
Key variables	<ul style="list-style-type: none"> • Educational history (e.g., institution attended, date of degree, field of degree) • Professional activities and achievements (e.g., publications and patents) • Employer characteristics (e.g., organization type)

- Professional and personal life balance
- Mentoring, training, and research opportunities
- Career paths and plans (e.g., location and type of desired position)

Survey Design

Target population

The 2017 ECDS target population was all individuals who (1) earned their first doctoral degree (PhD, MD, or equivalent) between 1 July 2007 and 30 June 2017, and (2) were working in a master's degree- or doctorate-granting U.S. academic institution (excluding medical schools and centers) or an FFRDC during the week of 1 October 2017.

Sampling frame

Lists of potential early career doctorates—persons receiving their first doctorate within the past 10 years—working at institutions sampled from the set of academic institutions included in the 2016 Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS), and all FFRDCs listed on the FFRDC Master Government List maintained by NCSES (<https://www.nsf.gov/statistics/ffrdclist/>).

Sample design

The ECDS employed a two-stage sample design. The first stage was a stratified sample of 344 institutions with academic institutions, FFRDCs, and the National Institutes of Health (NIH) Intramural Research Program (IRP) placed in separate strata. Within academic institutions, large universities with medical schools and centers were split into medical and nonmedical sampling units. The nonmedical academic sampling units were then stratified into three subgroups based on Carnegie classification.

In the second stage, a stratified sample of potential early career doctorates was selected from each of the responding institutions. The sample was stratified by postdoc status, citizenship, race, and sex to enhance representation across these key domains.

Because of low response rates and the resulting potential for nonresponse bias in subpopulation estimates, data for the medical schools and centers and the NIH IRP strata are excluded from published tables and figures. For research purposes, the restricted-use data include responses from early career doctorates working at medical schools and centers and the NIH IRP.

Data Collection and Processing

Data collection

The ECDS was a two-stage data collection. The first stage included obtaining lists of all potential early career doctorates working at the sampled institutions the week of 1 October 2017 and who had earned their first doctorate or equivalent between 1 July 2007 and 30 June 2017. When highest degree and/or doctoral award date were missing for some early career doctorates within the sampled institution's administrative data, those institutions were asked to include all individuals within those job titles that were likely to be filled by doctorate holders.

For the second stage of data collection, two modes of data collection were available to early career doctorates: a Web-based survey and computer-assisted telephone interviewing. The recruitment protocol included a notification contact followed by an e-mail containing a unique link to the Web survey. A series of multimodal reminders (e-mail, mail, and phone) was used to improve response rates. These reminders ceased when the sample member completed the survey, was determined to be ineligible, or refused to participate. No incentives were offered to participants.

Data processing

The data collected in the ECDS were subject to manual and automated data processing and correction procedures, such as editing and imputation. For items with missing data, the ECDS used logical, cold-deck, and hot-deck imputation techniques as appropriate.

Estimation techniques

The ECDS used a complex sample design. To produce population estimates, person-level analysis weights were calculated that accounted for the differential sampling rates used in the first and second stages and were then adjusted to account for nonparticipation and unreleased institutions in the first stage and nonresponse and unknown eligibility in the second stage. Estimates were calculated as the sums of the final person-level analysis weights. Replicate weights used in the jackknife variance estimation technique were calculated in a similar manner.

Survey Quality Measures

Sampling error

Estimates of sampling errors associated with this survey were calculated using the jackknife replicate weights.

Coverage error

At the institution level, coverage extends to all institutions in the GSS universe (a census of U.S. academic institutions granting master's or doctoral degrees in science, engineering, or health) and all FFRDCs (based on a Master Government List maintained by NCSSES) and thus coverage error is minimal.

At the individual level, undercoverage could result if an institution omitted some early career doctorates from the lists they provided (e.g., by leaving out individuals working at a particular center). Similarly, overcoverage could result if an institution's list included ineligible individuals (i.e., those who do not have a doctoral degree or whose degree was awarded more than 10 years ago). Throughout the list development process, list coordinators received guidance to help avoid these types of errors, and lists were checked against expected counts to minimize coverage error.

Nonresponse error

For the academic institutions (excluding medical schools and centers) and FFRDCs, the institution response rate was 77.0%, and the individual-level response rate was 65.1%.

To examine the potential nonresponse bias in the 2017 ECDS data, a nonresponse analysis study was conducted. The results of this study showed that all detectable differences were properly addressed by the nonresponse weighting adjustments of the survey data.

As noted above, because of low response rates and the resulting potential for nonresponse bias in subpopulation estimates, data for the medical schools and centers and the NIH IRP strata have been excluded from published tables and figures. For research purposes, the restricted-use data include responses from early career doctorates working at medical schools and centers and the NIH IRP.

Measurement error

Cognitive testing of the survey instrument informed decisions to help minimize measurement errors from ambiguous questions and from a multimode survey approach.

Data Availability and Comparability

Data availability

Data from the ECDS will be available at <https://www.nsf.gov/statistics/srvyecd/>.

Data comparability

This is the first full-scale implementation of the ECDS. Limited data elements are comparable with those from the ECDS pilot study and the Survey of Doctorate Recipients. As a result, use caution when comparing ECDS data with data from other sources.

Data Products

Publications

NCSES releases the data from this survey through InfoBriefs and Data Tables (<https://www.nsf.gov/statistics/srvyecd/>).

Information from this survey is also included in the 2021 *Women, Minorities, and Persons with Disabilities in Science and Engineering* report.

Electronic access

Access to restricted data for researchers interested in analyzing microdata can be arranged through an NCSES licensing agreement. For more information on licensing, see <https://www.nsf.gov/statistics/license/>.